

REMARKS

Examination and allowance of claims 1-23 are requested.

35 U.S.C. § 121 Election

In the Office Action of November 29, 2002, the Examiner states that "claim 22 was not subject to the restriction requirement". Even though claim 22 is not subject to a restriction requirement, the Office Action of November 29, 2002 purports to hold claim 22 withdrawn as directed to a non-elected invention!

If claim 22 is not subject to a restriction requirement, then it must be examined and cannot be held as withdrawn from consideration.

On the other hand, if claim 22 is deemed to be drawn to a non-elected invention, then the Examiner must state the grounds for restricting claim 22 from elected claims 1-17 so that the applicants may have the opportunity to traverse the restriction requirement and petition it.

Because claim 22 has been held by the Examiner to be not subject to a restriction requirement, it is submitted that claim 22 must be examined with claims 1-17 and must properly be considered part of Group I.

MPEP Requirements

The Examiner is reminded that "*Claims are never species.*" MPEP 806.04(e). "**Election of species should not be required if the species claimed are considered unpatentable (obvious) over each other.**" MPEP 808.01(a). That is, the species must be patentably distinct as defined in MPEP 802.01.

The Examiner is again invited to identify in the specification and drawings, the patentably distinct embodiments so that an election can be made and the claims which read on each species can be identified.

### Election of Species Requirement

The applicants are unclear whether the election of species requirements in the Office Action of November 29, 2002 is intended to be the same election of species requirement as was set forth in the Office Action of July 25, 2002.

The July Office Action indicated that the two species were the species in which the data was collected without a gantry and the species in which the data is collected with a gantry. No species is disclosed or specifically claimed in which data is collected without a gantry. The only species disclosed and claimed in the present application is the species in which the detector heads are moved around the subject by a gantry. Accordingly, all claims are directed to the same gantry species. The applicants have already elected, with traverse, the embodiment of FIGURE 1 in which a gantry moves the detectors and pointed out that every claim reads on that embodiment.

The November Office Action identifies the species as being a species in which a continuously moving gantry carries the detector heads or one in which the projection data is collected without a gantry in increments less than 360°. Again, no embodiment is described in the specification in which the data is collected without a gantry. There are no claims which are specific to or which require the data to be collected without a gantry.

Perhaps a brief overview of the preferred embodiment described in the application would help. In the cardiac embodiment, a plurality of projection data sets are collected over 102° of rotation of the detector heads. It will be seen that when the gantry has two detector heads, 102° of rotation generates 204° of data. This is still an incomplete data set because the data does not span 360°.

It might be noted that these projection data sets can be collected in either of two ways: (1) using a stop and shoot gantry movement, or (2) using a continuously rotating gantry movement. In the stop and shoot mode, the gantry remains in a fixed position for several minutes while a projection data set is collected and then steps or rotates one angular increment (e.g., 3°) to the next angular position. After the head has

become stabilized in the new position, another projection data set is collected. In the continuously rotating mode, the gantry rotates very slowly such that the same several minute data collection interval is required for the detector head to move one angular increment, e.g., 3° in the preferred embodiment. The data collected over this 3° is binned or integrated into a single projection data set. Either way, a plurality of projection data sets are generated at or corresponding to discrete angular increments around the subject.

Regardless of which mode is used to generate the projection data sets, the data sets are subject to a resolution recovery process which works on incomplete (less than 360°) data sets.

Returning now to the November election of species requirement, **there is no disclosed or specifically claimed embodiment in which projection images are collected without a gantry.** Thus, the applicants cannot elect such a species. If the Examiner is trying to make an election of species requirement between the stop and shoot mode of gantry movement and the continuous rotate mode of gantry movement, then it is noted that claims 1-6, 8-14, 17, and 22 are generic. Claims 7, 15, 16, and 23 are specific to the continuous rotate mode. No claims are specific to the stop and shoot mode. If the Examiner is looking to make an election of species requirement between the continuous rotate mode and the stop and shoot mode, the applicants would be amenable to electing, with traverse, the continuous rotate mode for examination purposes.

#### Amendments to the Claims

The applicants have amended claims 1, 2, 12, 17, and 22 to claim the invention more clearly in the hopes that claiming the invention more clearly will lead to a more prompt resolution of the restriction of species issue.

The Figures

The Examiner suggests that the claims set forth features which are not shown in the drawings, but fails to identify any such features. If the Examiner would specifically identify the claimed features that he would like illustrated in the drawings, the applicants would be amenable to making appropriate drawing corrections or pointing out where such features are already illustrated in the existing drawings.

Telephone Interview

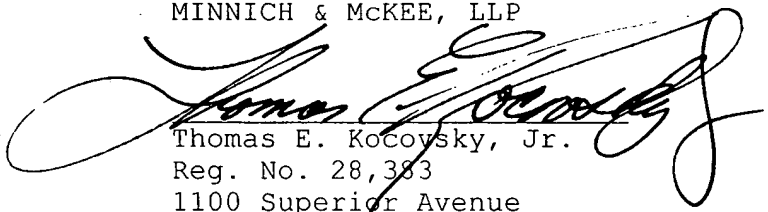
The Examiner is invited to telephone the undersigned to discuss any remaining issues in greater detail.

CONCLUSION

An early allowance of elected claims 1-17, 22, and 23 is requested. It is further requested that the Examiner reconsider the restriction of claims 18-21 and allow all claims.

Respectfully submitted,

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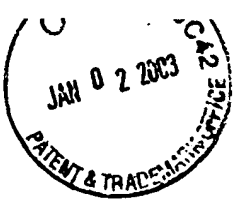


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CERTIFICATE OF MAILING

I hereby certify that this **AMENDMENT B AND REQUEST FOR CLARIFICATION** in connection with U.S. Patent Application Serial No. 09/782,331 is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C., 20231, on this 26<sup>th</sup> day of December, 2002.

By: Kelary McNulty



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: ) Examiner: D. ROBINSON  
W. HAWKINS, et al. )  
Serial No. 09/782,331 ) Art Unit: 3742  
Filed: February 13, 2001 ) Confirmation: 9813  
For: **LIMITED-ANGLE** )  
**FREQUENCY-DISTANCE** )  
**RESOLUTION RECOVERY** )  
**IN NUCLEAR MEDICINE** )  
**IMAGING** )  
Date of Last Office Action: )  
November 29, 2002 )  
Attorney Docket No.: ) Cleveland, OH 44114  
PKRZ 2 00655 ) December 26, 2002

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APPENDIX 1

Marked up copies of the amended claims showing the insertions in underlining and the deletions in brackets are as follows:

1. (Amended) A method of diagnostic imaging comprising:

collecting a plurality of projection data sets [at]  
corresponding to each of a plurality of angles around a subject,  
5 the projection images being collected over less than 360°;  
performing a resolution recovery process on the  
projection data sets; and  
reconstructing the resolution recovered projection  
data sets into an image representation.

2. (Amended) The method as set forth in claim [1]  
12 wherein the projection data sets span less an 360°.

12. (Amended) A method of diagnostic imaging comprising:

[continuous movement of a gantry which moves] moving  
a detector head in [a continuous angular] an orbit about a  
5 subject in an examination region in one of a (1) continuous  
rotate and (2) step and shoot mode;

collecting data during the [continuous] orbit and  
[sorting] organizing the data [into] in a plurality of  
projection data sets corresponding to each of a plurality of  
10 angular increments around a subject;

performing a resolution recovery process on the  
projection data sets; and

reconstructing the resolution recovered projection  
data sets into an image representation.

17. (Amended) The method of claim [16] 12 wherein  
projection data sets with collected projection data span less  
than 360°, the resolution recovery process function including:  
zero-filling projection data sets in the angular  
5 rotation direction, the zero-filled and actually collected  
projection data sets together spanning 360°; and

smoothing each interface between the actually  
collected and zero-filled data sets, the smoothed data sets  
being transformed into frequency space.

22. (Amended) A diagnostic imaging apparatus  
comprising:

a means for collecting a plurality of projection data  
sets [at] corresponding to each of a plurality of angles around  
5 a subject, the projection images being collected over less than  
360°;

a means for performing a resolution recovery process  
on the projection data sets; and

a means for reconstructing the resolution recovered  
10 projection data sets into an image representation.